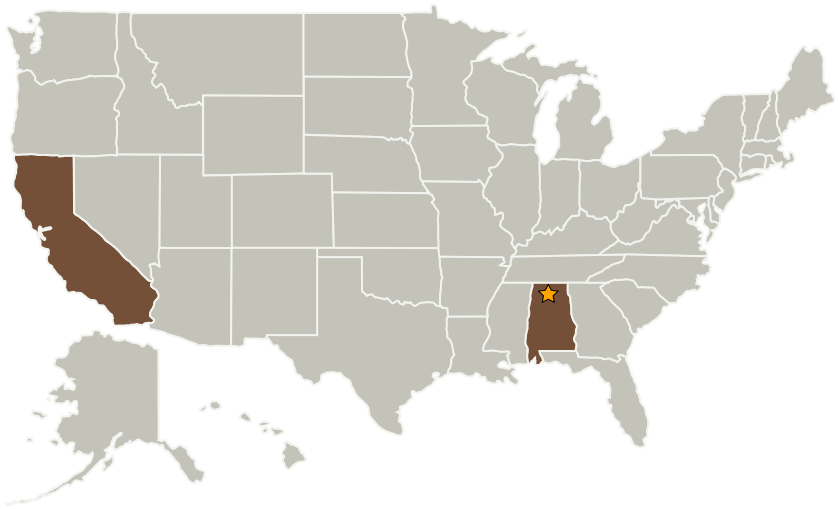
Friction Stir Processing of Cast Superalloys, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

This SBIR Phase I effort examines the feasibility of an innovative fabrication technology incorporating sand casting and friction stir processing (FSP) for producing affordable near net shape components made from high performance Ni-based superalloys. Sand casting is a relatively inexpensive casting method not traditionally used to manufacture superalloy castings. Instead of invested ceramic shells, the molds are produced from a mixture of fine sand and/or rammed graphite powder. Friction stir processing is an emerging microstructural modification technique based on friction stir welding (FSW). It can be applied to enhance the microstructure-properties of the cast material thus improve the damage tolerance capabilities. This step is needed to allow cast superalloy rocket propulsion components to be used without a casting factor.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Transition45 Technologies, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Orange, California

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Alabama	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.4 Sustainable Manufacturing